



Section E. River Sailing

Overview

Introduction

The section provides general information for operating on rivers, with emphasis on the western rivers. The western rivers (Mississippi River system) pose navigational concerns that often are not seen in harbor, coastal, or high seas sailing. Local knowledge is very important. Navigational techniques and the language both have differences that must be learned to become a competent river sailor.

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Major Piloting Differences

E.1. General

Some of the special considerations for river navigation include:

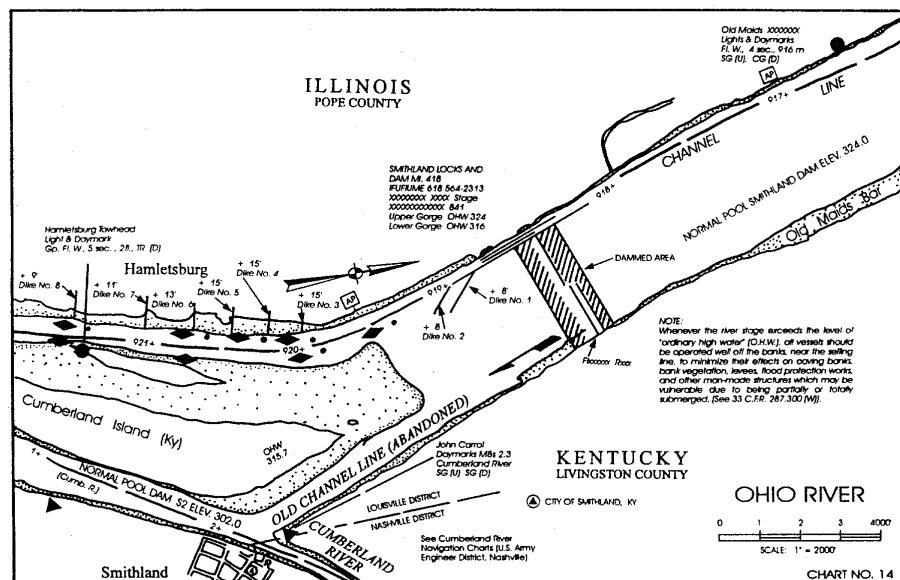
- Charts
- Mile marks
- Fixed aids
- Buoyage
- Compass
- Dead reckoning (DR) plot

E.2. Charts

Simple, line drawn “maps” that show the main geographical features of the waterway, the channel or sailing line, prominent manmade objects, and the various aids. River charts do not show landmarks such as stacks, water towers, or antennas. These charts do not always show the geographical names for areas along the bank. River charts only show structures immediately on the banks by symbol and footnote. Figure 14-46 provides a good example.

NOTE

A road map of the operating area is a good supplement for identifiable geographical names.



Sample River Chart
Figure 14-46



E.3. Mile marks	The Western Rivers have mile marks (beginning at the mouth or at the headwaters of the stream).
E.4. Fixed aids	Fixed aids (daymarks and lights) display the mile, usually as statute miles, on a “mile” board for that point of the river. Where no aid exists, landmarks such as bridges, creeks, islands, and overhead power lines, provide the mile-mark reference.
E.5. Buoyage	The U.S. lateral system of buoyage has differences when used on these rivers.
E.6. Compass	Compasses are not normally very useful on western rivers due to no plotting references on the chart and many rivers meander. However, boat-mounted compasses must be installed. There will be situations where the use of a compass can help determine a position. For example, on a meandering river with no prominent landmarks, comparing the compass heading with the north arrow on the chart will help identify the bend or reach where the boat is operating. A log is to be maintained showing each position.
E.7. Dead reckoning (DR) plot	As in coastal sailing, a boat’s approximate position is determine by dead reckoning - applying its speed, time and course from its last known position. However, because many rivers have numerous bends, it often is not possible to maintain a complete DR plot with precise course changes.



Conditions and Effects

E.8. General

Surface and bottom conditions of a river are unpredictable and can change quickly. Some of the unique situations you will have to deal with include:

- Silting and shoaling
 - Drift
 - Flood or drought
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E.9. Silting and shoaling

Silt is a mass of soil particle carried in water. It can clog boat cooling water intakes and wear out strut bearings and shafts. Silt settles on the bottom as shoaling, either adding to or creating sand bars or mud banks.

E.10. Drift

“Drift” or “driftwood” is floating debris carried by the river flow and washed or lift from the banks. Running drift can damage a boat.

E.11. Flood or drought

Tides affect rivers near the coast, but flooding or drought will greatly affect the vertical level (depth) of the entire river.

E.11.a. Flood

Flooding is created by runoff or drainage from heavy rains or melting snow. A waterway will contain strong currents and a lot of running drift during flooding. Navigating outside the river banks requires caution and local knowledge.

E.11.b. Drought

Drought is low water level. This can result in the closing of channels. Snags and obstructions that once were cleared easily become hazards to navigation. Also, sandbars and mud flats will appear where it was once safe to operate.

NOTE

Refer to Chapter 10, *Boat Handling* for information on operating boats in narrow channels.



Locks and Dams

E.12. General

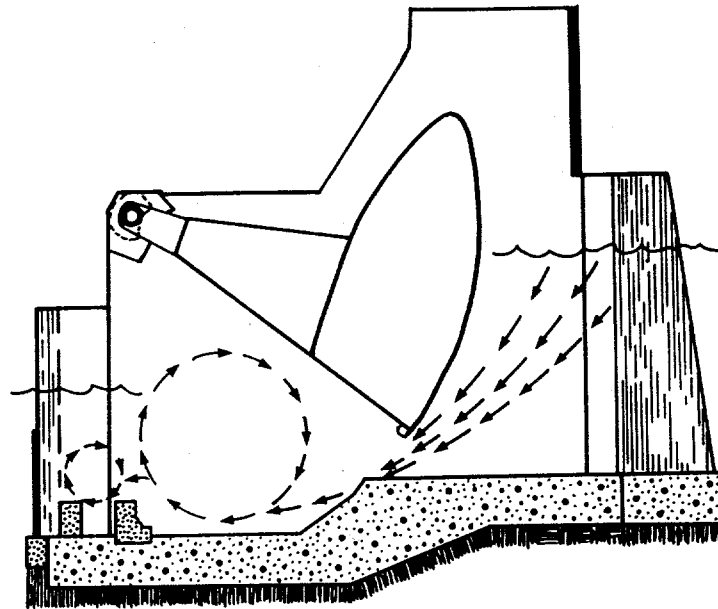
Locks and dams provide a navigable channel for river traffic. Navigation dams release water, as necessary, to maintain a navigable channel during the navigation season. Locks release water as a part of their normal operation. Both of these can be a safety problem for boats. Knowledge of locks and dams, including location, use and associated hazards, is essential for safe boat operations.

E.13. Construction and operation

The navigation dams on the Mississippi, Illinois and Ohio rivers can be of different construction. Two types of dam construction are the Tainter gate and the Roller gate. Also, some dam releases are controlled remotely. This is the kind of local knowledge that the boat crew needs to check before operating in that area.

Most people know that water released from a dam can create a powerful, turbulent current going downstream. However, an upstream water current can exist close to the lower or downstream side of a dam. Operating too close to the downstream side of a dam can result in the boat being drawn into the dam.

A strong suction is created by the rush of water underneath the upper side of a roller-gate dam. (See Figure 14-47) A boat drifting into the dam on the upper side is in no danger on the surface of being drawn into the gate but do not go into the water.



Roller Gate Dam
Figure 14-47

E.14. Navigation displays

When locks at fixed dams and moveable dams have their dams up, they will show navigation lights during hours of darkness. These lights are either green, red, or white and in groups of one, two or three. A circular disc may also be shown. The significance of these displays are explained in local guidance.

E.15. Lock operations

The purpose of a lock is to raise or lower the boat to the level of the channel that it wants to continue to navigate. Locks come in all shapes and sizes, but they all operate on the principle that water seeks its own level. A lock is an enclosure with accommodations at both ends (generally called gates) to allow boats to enter and exit. The boat enters, the gates are closed, and by a system of culverts and valves, the water level in the lock aligns with the pool level of the upstream or downstream side of the lock. The gate then opens and the boat can continue on its way.

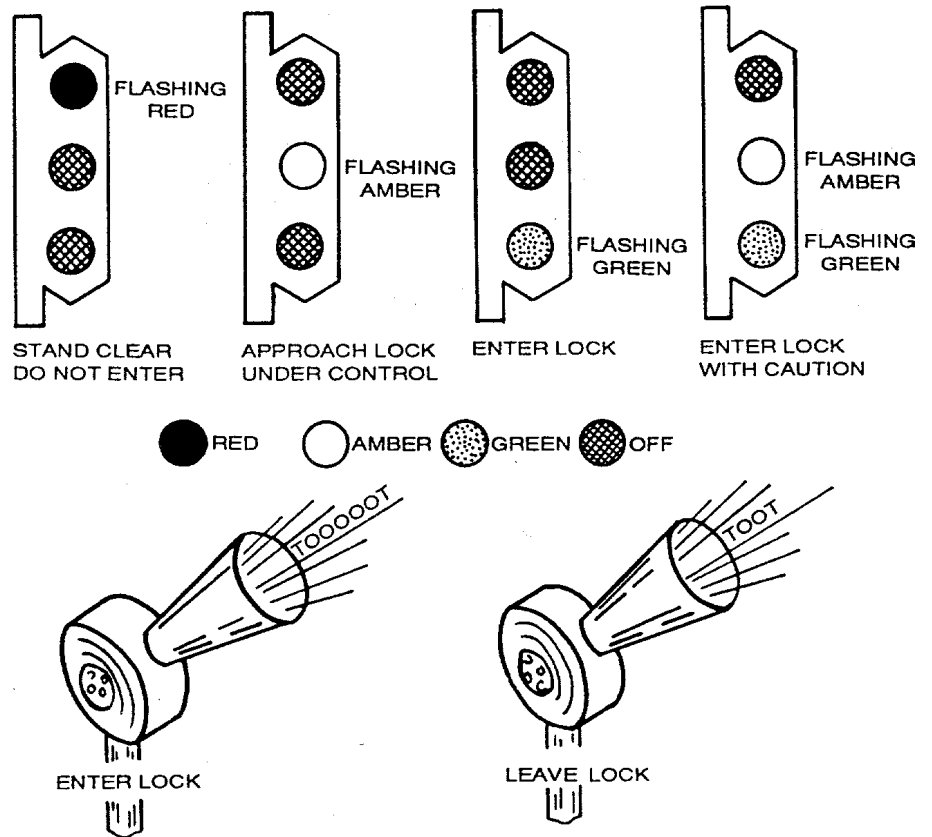


E.16. Locking procedures

There are many common locking procedures but local regulations can vary. The boat crew must check local guidance for correct locking procedures of each lock. Standard locking signals are shown in Figure 14-48. Precautions to take in locking include:

- do not come closer than 400 feet of the lock wall until the lockman signals to enter
- moor to the side of the lock wall as directed
- if using your own mooring lines, they should be at least 50 feet long with a 12-inch eye splice
- do not tie mooring lines to the boat; tend the lines as the water level changes
- be prepared to cast off lines in an emergency; a small hand axe or hatchet should be available
- use fenders
- do not moor to ladder rungs embedded in the lock walls
- wait for the lockman's signal (an air horn) to depart
- depart in the same order that you entered the lock with other boats
- steer for the channel and keep a sharp lookout for craft approaching from the other direction.

At locks with “small craft signals”, you may signal the lockman that you want to pass. After signaling, stand clear and wait for instructions. Many locks are radio-equipped to receive requests that way. Consult the appropriate navigation charts for radio-equipped locks, the frequency, and the call sign.



Standard Locking Signals
Figure 14-48



E.17. General Considerations

General considerations around locks include:

- The Secretary of the Army sets the priorities for safe and efficient passage of the various types of craft on inland waterways. Priorities, listed in descending order with the highest priority on top, are:
 - U.S. military craft
 - vessels carrying U.S. mail
 - commercial passenger craft
 - commercial tows
 - commercial fisherman
 - recreational craft
 - Under certain conditions, boats may be locked through with other crafts having a higher priority. This occurs only when there is no delay and neither craft is placed in jeopardy.
 - Lockmen have the same authority over a boat in a lock as the traffic police have over a car at an intersection. For safety purposes, obey the lockman's instructions.
 - Every boat should carry a copy of, and the crew should be familiar with the regulations governing navigation on the rivers in its AOR.
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Safety Considerations Around Navigation Dams

E.18. General

General safety considerations include:

- Stay clear of danger zones - 600 feet above and 100 feet below dams.
 - Approach dams at reduced speed, along the shore at the lock.
 - Be “dam” conscious:
 - (1) During the filling process, it is dangerous to approach near the intake ports in the lock walls above the upstream lock gates. The filling process creates a powerful suction as water rushes into the culverts. Boats must stay clear of the locks until signaled to approach.
 - (2) During the emptying process, a strong undercurrent and suction is created in the lock chamber. This suction occurs next to the lock walls and is created by the water rushing into the filling and emptying ports of the lock.
 - (3) Wearing a PFD may not keep you from being pulled under the water in these circumstances.
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Flood Warnings

E.19. General

During flood condition, do not use the waterway if you do not have to go out. Dangers include:

- currents are much stronger,
 - channels can shift,
 - obstructions can be hidden under the water,
 - drift hazards (trees and other debris) increase;
 - aids to navigation can be broken; and
 - bridge clearances are reduced.
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Common River Sailing Terms

E.20. General

The following terms and their definitions are the most commonly used in river sailing.

Term	Definition
Auxiliary Lock	A small secondary lock next to the main lock.
Backwater	The water backed up a tributary system.
Bar	A deposit of sand or gravel in or near the channels that, at times, prevents boat traffic from passing.
Bend	A bend of the river is like a curve in a highway.
Berm	The sharp definitive edge of a dredged channel such as in a rock cut.
Bight of a Bend	Sharpest part of a curve in a river or stream.
Bitts, Floating	Part of a lock system for securing a boat waiting in a lock, recessed in lock walls.
Boil	Turbulence in the water resulting from deep holes, ends of dikes, channel changes, or other underwater obstructions.
Caval or Kevel	A steel cleat of special design on barges and towboats for making aft mooring and towing lines.
Chute	Section of river that is narrower than ordinary and through which the river current increases. It is also the passage behind an island that is not the regular channel.
Deadhead	A water soaked wooden pile, tree, or log that floats at the surface of the water (barely awash), usually in a vertical position.
Dike	A structure of pilings or stone that diverts the current of a river.
Down Draft	The natural tendency of a river current to pull the boat downstream when making a river crossing.
Draft	A crosscurrent that is usually designated as an out draft, or as a left or right-handed draft.
Draw Down	The release of water through one dam before the arrival of a significant increase in water from the upper reaches of the river.



Term	Definition
Drift	- It is debris floating in or lodged along the banks of the river. (Also known as driftwood.)
Flat Pool	The normal stage of water in the area between two dams. It is maintained when little or no water is flowing; therefore the pool flattens out.
Flood Stage	A predetermined level or stage along the main river bank where flooding will occur or may overflow in the particular area.
Foot of _____	The downstream end or lower part of a bend or island.
Gauge	A scale graduated in tenths of a foot which shows the water level or river stage. A lower gauge is one which shows the downstream side of a dam and an upper gauge is one on the upstream side.
Head of _____	The upstream end or beginning of a bend or island.
Left Bank	the left bank of a river when going down stream, properly termed left bank descending.
Levee	An embankment or dike constructed for flood protection.
Lock	A chamber built as part of a river dam to raise or lower boat traffic that wants to pass the dam.
Lock Gate	A moveable barrier that prevents water from entering or leaving a lock chamber.
Mile Board	A 12" x 36" board above a river aid and with the river mileage at that point from a given location.
Open River	Any river having no obstructions such as dams, or when the river stage is high enough to navigate over movable dams.
Pool Stage	The stage of water between two successive dams. It is usually at the minimum depth to maintain the depth in the channel at the shallowest point.
Reach	Usually a long-straight section of a river.
Right Bank	The right bank of a river when going downstream, properly termed as right bank descending.
Slack Water	A location where there is a minimum current.
Snag	Tree or log embedded in the river bottom.



Term	Definition
Stern Line Talk	Supposedly factual information about anything passed between river people.
Tow	One or more barges made up to be transported by a boat.
Towboat	A river boat that push barges ahead.
